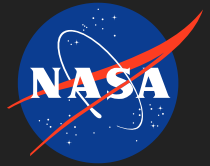


Real-Time Flight and Airspace Risk Monitoring for Airline Operations, Phase I

Completed Technology Project (2018 - 2019)



Project Introduction

Our Flight and Airport-Airspace Monitor (FAAM) will provide airline dispatchers and airline operations center managers a real-time tool to estimate the safety margin of a terminal airspace and flights operating in that airspace. Our concept divides the safety monitoring architecture into two components: an Airspace/Airport Monitoring component, and a Flight Monitoring system. The Airspace Monitor combines data on weather, infrastructure state, traffic density, and aircraft positions and planned trajectories with predictive analytics on aircraft separations and conflict rates to infer the (hidden) risk state of the airspace. The Flight Monitor uses airline and aircraft-based data to evaluate potential aircraft risks from equipment state and certification, and the potential for pilot fatigue based on elapsed crew duty time and time of day. Our architecture can readily add real-time crew monitoring in future instantiations.

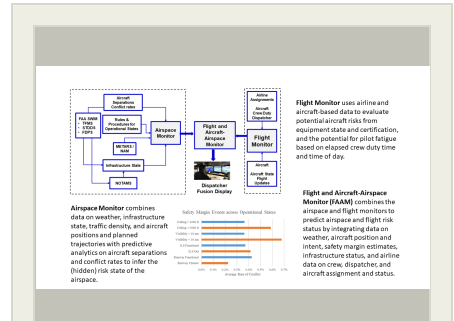
Separating the airspace and flight monitoring modules offers a significant development and deployment benefit. All the data for the Airspace Monitor are publicly available and the module can be built and applied NAS-wide without restriction. All airline proprietary and personal data are contained within the Flight Monitor under direct airline control. The airline can access our airspace risk assessment monitor and combine it with its proprietary flight and personnel information to monitor its flights. Our Flight Monitor also offers the available infrastructure to expand into more detailed pilot and aircraft monitoring.

We will demonstrate how our tool can integrate with airline operations decision support systems to provide a monitoring and alerting system for use by dispatchers in real-time. Our system will also provide for continuous data collection and storage, enabling follow-on trend and statistical analyses of flight operational issues, pilot fatigue, and anomalies by airline safety officials and NASA researchers.

Anticipated Benefits

Our FAAM prototype would provide a key component for meeting Real-time System-wide Safety Assurance milestone for terminal area safety margin monitoring. The Airspace Monitor providing RSSA requires real-time monitoring of aircraft with access to information that only the airline possesses. Our architecture combines the public airspace monitoring with airline proprietary flight operations data to offer a comprehensive monitoring solution.

FAAM targets airline operations centers as the initial users, supporting dispatchers as they plan and monitor flights as part of their business and regulatory responsibilities to maintain flight safety. The FAA will also benefit from using FAAM as a prognostic situation awareness tool for shift managers and possibly controllers. Deployed widely, FAAM would form the foundation for



Real-Time Flight and Airspace Risk Monitoring for Airline Operations, Phase I

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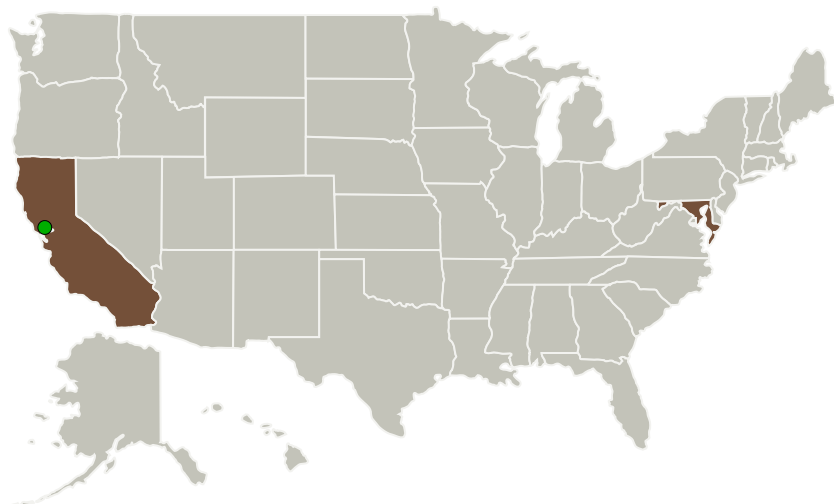
Real-Time Flight and Airspace Risk Monitoring for Airline Operations, Phase I

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NAS-wide safety margin monitoring and alerting system, a System Command Center for safety monitoring and alerting.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Robust Analytics	Lead Organization	Industry Women-Owned Small Business (WOSB)	Crofton, Maryland
● Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations	
California	Maryland

Project Transitions

July 2018: Project Start

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Robust Analytics

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

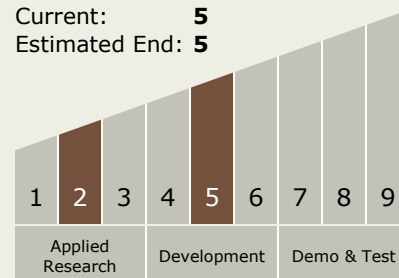
Carlos Torrez

Principal Investigator:

Peter F Kostiuk

Technology Maturity (TRL)

Start: **2**
Current: **5**
Estimated End: **5**



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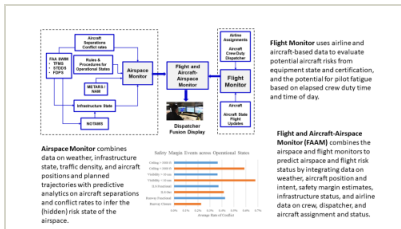


February 2019: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/141258>)

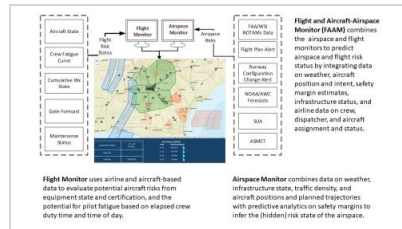
Images



Briefing Chart Image

Real-Time Flight and Airspace Risk Monitoring for Airline Operations, Phase I

(<https://techport.nasa.gov/image/128737>)



Final Summary Chart Image

Real-Time Flight and Airspace Risk Monitoring for Airline Operations, Phase I

(<https://techport.nasa.gov/image/135802>)

Technology Areas

Primary:

- TX15 Flight Vehicle Systems
 - TX15.1 Aerosciences
 - TX15.1.6 Advanced Atmospheric Flight Vehicles

Target Destination Earth